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ATTORNEY DOCKET NO. 10012822 -1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Robert G. Gann	**Confirmation No.:**	3197
Application No.:	09/845852	**Examiner:**	Sohn, Seung C
Filing Date:	Apr 30, 2001	**Group Art Unit:**	2878
Title:	Detecting A Defect In An Image In An Image Scanner (as Amended)		

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 01/19/2005.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

( ) (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

( )	one month	$120.00
( )	two months	$450.00
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( )	four months	$1590.00

( ) The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $500.00. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

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Number of pages: 16

Typed Name: Donna M Kraft

Signature: Donna M Kraft

Respectfully submitted,

Robert G. Gann

By A. W. Winfield

Augustus W Winfield

Attorney/Agent for Applicant(s)
Reg. No. 34,046

Date: Jan. 19, 2005

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PATENT APPLICATION

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Date: Jan. 19, 2005

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PATENT APPLICATION

ATTORNEY DOCKET NO. 10012822-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Robert G. Gann

Serial No.: 09/845,852 Examiner: Sohn, Seung C.

Filing Date: 04/30/2001 Group Art Unit: 2878

Title: DETECTING A DEFECT IN AN IMAGE IN AN IMAGE SCANNER

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

BRIEF ON APPEAL

INTRODUCTION

Pursuant to the provisions of 37 CFR Part 41, Subpart B, applicants hereby appeal to the Board of Patent Appeals and Interferences (the "Board") from the examiner's final rejection dated 10/19/2004. A notice of appeal was timely filed on 01/19/2005 concurrently with this brief on appeal, in accordance with 37 CFR § 41.31(a)(1).

REAL PARTY IN INTEREST

The entire interest in the present application has been assigned to Hewlett-Packard Development Company, L.P., as recorded at reel 014061, frame 0492.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-18 are pending in the application.

Claims 6-9 and 15-18 are withdrawn from consideration.

Claims 1-3 and 10-12 have been finally rejected.

Claims 4-5 and 13-14 are objected to.

Claims 1-3 and 10-12 are on appeal.

STATUS OF AMENDMENTS

There are no after-final amendments.

SUMMARY OF CLAIMED SUBJECT MATTER

The invention relates generally to devices for digital electronic scanning of images and more specifically to detection of dust and scratches and other surface defects. A scanner includes a platen and a calibration target. The calibration target is used to compensate, before scanning, for variation in sensitivity of individual photosensors, and for variation in light intensity along the length of a scanline (a process called Photo-Response Non-Uniformity (PRNU) calibration). In example embodiments of the invention, methods are used to distinguish between a defect on the calibration target from a defect on the platen. Narrow streaks (light or dark), corresponding to a few photosensors, appearing primarily in one color channel, are analyzed to see if the streaks are likely caused by a surface defect, either on the calibration target or on the platen. Debris on the calibration target causes the PRNU gain for some photosensors to be abnormally high. If the debris is later hidden by the document being scanned, the result is a high intensity streak for one color channel in the digitized image. Accordingly, images are searched for a high intensity streak in one color channel of the digitized image corresponding to an anomalous PRNU gain. Debris on the platen introduced after PRNU calibration results in a low intensity streak in one color channel, with normal corresponding PRNU gains. Accordingly, the

system may also search for a low intensity streak in one color channel of the digitized image with a normal corresponding PRNU gain.

Claim 1 specifies determining whether at least one line is present in image data for a particular color channel (figure 2, 206; figure 3, 300, 306, 310; figure 5, 500, 502, 504, 508) (page 6, lines 4-14; page 7, lines 21-27; page 9, lines 4-5, 14-17, 19-24; page 11, lines 5-8) and determining whether a calibration gain for a photosensor corresponding to the line is normal (page 6, lines 15-16; page 7, line 27 through page 8, line 1; page 9, lines 3-4; page 9, line 25 through page 10, line 3; page 11, lines 12-13, 15-16).

Claim 2 specifies determining (figure 2, 202) that a gain associated with a particular photosensor, in a particular line-array of photosensors (figure 1, 110, 112, 114), in a photosensor assembly (figure 1, 108), exceeds a predetermined gain threshold, the gain having been calibrated using the calibration target (figure 1, 118) (page 6, lines 4-14; page (page 9, lines 1-10); determining (figure 2, 206) that an image intensity measurement for the particular photosensor exceeds a predetermined intensity threshold; and determining that an image intensity measurement for each photosensor, physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors (page 6, lines 12-14; page 9, lines 8-10), does not exceed the predetermined intensity threshold.

Claim 3 specifies determining (figure 3, 300) that intensity data, from a particular photosensor, in a particular line-array of photosensors (figure 1, 110, 112, 114), in a photosensor assembly (figure 1, 108), is less than a predetermined intensity threshold; and determining (figure 3, 306, 310) that intensity data, for each photosensor, physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors, is not less than the predetermined intensity threshold (page 7, line 21 through page 8, line 2; page 9, line 11, through page 10, line 3).

Claim 10 specifies a first line-array of photosensors (figure 1, one of 110, 112, 114); a second line-array of photosensors (figure 1, one of 110, 112, 114); a processor; and the processor determining that a defect exists when lines are present in image data from only one of the first and second line-arrays of photosensors and when calibration

gains, associated with photosensors corresponding to the lines, are normal (page 7, line 21 through page 8, line 2; page 8, lines 24-26; page 9, line 28 through page 10, line 3).

Claim 11 specifies a calibration target (figure 1, 118); a photosensor assembly (figure 1, 108) comprising a plurality of line-arrays of photosensors (figure 1, 110, 112, 114); a processor; a particular photosensor, in a particular line-array of photosensors, in the photosensor assembly, having an associated gain that exceeds a predetermined gain threshold, the gain having been calibrated using the calibration target; the particular photosensor having an associated image intensity measurement that exceeds a predetermined intensity threshold; and the processor determining that a defect exists when an image intensity measurement for each photosensor physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors, does not exceed the predetermined intensity threshold (page 7, line 21 through page 8, line 2; page 8, lines 24-26).

Claim 12 specifies a calibration target (figure 1, 118); a photosensor assembly (figure 1, 108) comprising a plurality of line-arrays of photosensors (figure 1, 110, 112, 114); a processor; a particular photosensor, in a particular line-array of photosensors, in a photosensor assembly, having an associated image intensity measurement that is less than a predetermined intensity threshold; and the processor determining that a defect exists when an intensity output, for each photosensor physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors, is not less than the predetermined intensity threshold (page 7, line 21 through page 8, line 2; page 8, lines 24-26).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1 and 10 are indefinite under 35 U.S.C. § 112, second paragraph.
2. Whether claims 2-3 and 11-12 are indefinite under 35 U.S.C. § 112, second paragraph.
3. Whether claim 3 is unpatentable under 35 U.S.C. § 102(b) as anticipated by U.S. Patent Number 6,026,174 (Palcic *et al.*)

ARGUMENT

CLAIMS 1 AND 10

In the paper dated 10/19/2004, claims 1 and 10 were rejected under 35 USC 112, second paragraph, as allegedly indefinite. Specifically, the examiner questions the language "a calibration gain for a photosensor corresponding to the line is normal".

From MPEP 2173.02, the proper test for indefiniteness is as follows:

(A) interpretation of the claim in light of the particular application disclosure;

(B) interpretation of the claim in light of the prior art; and

(C) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made

The background section of the application, in discussing the prior art, discusses Photo-Response Non-Uniformity (PRNU) calibration, which adjusts, for each photosensor, an amplifier gain, for sensor sensitivity, light source variation, or other system non-uniformity. Accordingly, applicant submits that one of ordinary skill in the art would interpret claims 1 and 10 in terms of a range of calibrated amplifier gains, where each gain is associated with a photosensor. As applicant understands the rejection, the primary issue is the word "normal".

In the paper dated 10/19/2004, at page 3, the examiner asserts that since each gain associated with a photosensor is different, it is hard for one of ordinary skill in the art to determine what is normal or abnormal. The examiner also asserts that the specification does not specifically disclose what "normal" is.

The specification provides one example of determining whether a calibration gain is normal. From page 6, lines 4-24, and in particular, lines 15-16, there is a predetermined threshold above which an amplifier calibration gain is outside the normal range of amplifier calibration gains. In addition, given any set of numbers, one of ordinary skill in the art with a basic knowledge of statistics could employ a vast number of techniques to classify some of the numbers as normal, and some of the numbers as not normal. For example, for

a normal distribution, it is common to classify numbers as abnormal if they are more than three standard deviations from the mean.

CLAIMS 2-3 AND 11-12

In the paper dated 10/19/2004, claims 2-3 and 11-12 were rejected under 35 USC 112, second paragraph, as allegedly indefinite. Specifically, the examiner questions the meaning of the term: "an image intensity measurement for each photosensor, physically corresponding to the particular photosensor." Specifically, at page 2, the examiner asserts: "It is unclear how an image intensity measurement is *physically corresponding* to the particular photosensor." Similarly, on page 4, just the word "physically" is italicized.

From MPEP 2173.02, the proper test for indefiniteness is as follows:

(A) interpretation of the claim in light of the particular application disclosure;

(B) interpretation of the claim in light of the prior art; and

(C) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made

As an adverb, the word "physically" means in accord with physical laws, or something real as opposed to something imaginary. In claims 2-3 and 11-12, it is used to clarify that there is an actual real correspondence, not just a logical correspondence. In the present application, for each photosensor, the resulting signal is amplified and converted into an intensity measurement. For each photosensor, there is one corresponding PRNU gain, and one corresponding intensity measurement. In the application at page 5, lines 22-25: "Signals from the line-arrays of photosensors (110, 112, 114) are typically amplified by at least one amplifier (not illustrated), converted to digital values by at least one analog-to-digital converter (not illustrated), and the resulting digital values are stored in a memory (not illustrated) where they may be analyzed by a processor (not illustrated)." In the application, at page 6, line 1: "That is, the signal from each photosensor has an associated unique gain determined by PRNU calibration." In the specification, at page 9, lines 16-20, a dark stripe impacts the Nth pixel of multiple scanlines for multiple color channels.

From prior art not cited in the present application, intensity measurements may be combined in all sorts of ways to form logical pixels in an image. In a resulting image file, an image pixel may be logically associated with multiple photosensors. However, in this application, there is a one-to-one correspondence, and the word "physically" is intended to clarify that the correspondence between one image intensity measurement and one photosensor is physical, not just logical.

CLAIM 3

In the paper dated 10/19/2004, claim 3 is unpatentable under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent Number 6,026,174 (Palcic *et al.*).

From MPEP 2131:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

"The elements must be arranged as required by the claim, but . . . identity of terminology is not required." *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claim 3 is as follows:

3. A method for detecting a defect in image data, comprising:

determining that intensity data, from a particular photosensor, in a particular line-array of photosensors, in a photosensor assembly, is less than a predetermined intensity threshold; and

determining that intensity data, for each photosensor, physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors. is not less than the predetermined intensity threshold.

Claim 3 specifies that intensity data from a particular photosensor in one array is less than a threshold, and intensity data from corresponding photosensors in other line arrays are not less than the threshold. Palcic *et al.* disclose determining that some image data is less than a threshold, but Palcic *et al.* do not teach or suggest associating that data with particular photosensors. Palcic *et al.* do not teach or suggest associating image data with corresponding photosensors in multiple line arrays. Palcic *et al.* do not teach or suggest that intensity data from a particular photosensor in one array is less than a threshold, and intensity data from corresponding photosensors in other line arrays are not less than the threshold.

For both the first element of claim 3, and the second element of claim 3, the examiner cites Palcic *et al.*, column 6, lines 5-7, and step 72 of figure 2B. The cited lines are as follows: "At a step 72, all pixels in the cell image having an intensity less than the threshold value are identified." Step 72 states: "Identify all pixels with intensity < threshold." The cited lines say nothing about photosensors, nothing about image data corresponding to photosensors, nothing about corresponding photosensors in multiple line arrays, and nothing about image data from corresponding photosensors not being less than the threshold.

In the paper dated 10/19/2004, at page 4, the examiner further argues that Palcic *et al.* disclose associating the data with particular photosensors since: " . . . all pixels (including a particular photosensor) are determined and indentified whether the values are less than the threshold value." First, Palcic *et al.* do not teach or suggest anything about associating image pixels with photosensors. Second, assuming for the sake of argument that the examiner is correct, claim 3 specifies more than just associating image data with a particular photosensor. Claim 3 specifies other photosensors that correspond to the particular photosensor, and that the image data for those specific other photosensors are not less than the threshold.

CONCLUSION

In view of the above, applicant respectfully requests that the examiner's rejection of claims 1-3 and 10-12 be reversed.

Respectfully submitted,

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APPENDIX

CLAIMS ON APPEAL

1. A method, in an image scanner, for detecting a defect, comprising:

determining whether at least one line is present in image data for a particular color channel; and

determining whether a calibration gain for a photosensor corresponding to the line is normal.

2. A method for detecting a defect on a calibration target for an image scanner, comprising:

determining that a gain associated with a particular photosensor, in a particular line-array of photosensors, in a photosensor assembly, exceeds a predetermined gain threshold, the gain having been calibrated using the calibration target;

determining that an image intensity measurement for the particular photosensor exceeds a predetermined intensity threshold; and

determining that an image intensity measurement for each photosensor, physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors, does not exceed the predetermined intensity threshold.

3. A method for detecting a defect in image data, comprising:

determining that intensity data, from a particular photosensor, in a particular line-array of photosensors, in a photosensor assembly, is less than a predetermined intensity threshold; and

determining that intensity data, for each photosensor, physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors, is not less than the predetermined intensity threshold.

10. A scanner, comprising:

a first line-array of photosensors;

a second line-array of photosensors;

a processor; and

the processor determining that a defect exists when lines are present in image data from only one of the first and second line-arrays of photosensors and when calibration gains, associated with photosensors corresponding to the lines, are normal.

11. A scanner, comprising:

a calibration target;

a photosensor assembly comprising a plurality of line-arrays of photosensors;

a processor;

a particular photosensor, in a particular line-array of photosensors, in the photosensor assembly, having an associated gain that exceeds a predetermined gain threshold, the gain having been calibrated using the calibration target;

the particular photosensor having an associated image intensity measurement that exceeds a predetermined intensity threshold; and

the processor determining that a defect exists when an image intensity measurement for each photosensor physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors, does not exceed the predetermined intensity threshold.

12. A scanner, comprising:

a calibration target;

a photosensor assembly comprising a plurality of line-arrays of photosensors;

a processor;

a particular photosensor, in a particular line-array of photosensors, in a photosensor assembly, having an associated image intensity measurement that is less than a predetermined intensity threshold; and

the processor determining that a defect exists when an intensity output, for each photosensor physically corresponding to the particular photosensor, in all line-arrays in the photosensor assembly other than the particular line-array of photosensors, is not less than the predetermined intensity threshold.